INSTRUCTION MANUAL

WIRELESS GATEWAY
(Modbus/TCP (Ethernet), Modbus-RTU Transparent 920MHz Band Wireless Device (Parent device) for Taiwan)

MODEL **WL40EW2TW**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Wireless gateway...(1)
Antenna ....(1)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.
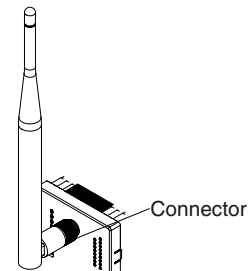
■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.
For information on the introduction of wireless device, refer to the 920MHz band wireless device users manual (EM-9120).
For information on the detailed setting, refer to the operating manual (EM-9115-B).
For information on Modbus specification, refer to the Modbus Protocol Reference Guide (EM-5650).
These manuals are downloadable at our web site.

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

• Locate the power input rating marked on the product and confirm its operational range as indicated below:
    24V DC rating: 24V ±10%, ≤ 90mA
    12V DC rating: 12V ±10%, ≤ 170mA

■ GENERAL PRECAUTIONS

• Before you remove the unit or mount it, turn off the power supply for safety.

■ ENVIRONMENT

• Indoor use.
• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
• Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
• Environmental temperature must be within -20 to +60°C (-4 to 140°F) with relative humidity within 10 to 90% RH in order to ensure adequate life span and operation.
• Attach the antenna to the unit.
• Attachment and adjustment of sleeve antenna; Loosen the connector (See the top-right figure.), and rotate the antenna. Holding the antenna vertical, tighten the connector by hand. Make sure to fix the antenna firmly.

Connector

• Attachment of rooftop antenna; There is a magnet on the bottom face which allows you to attach the antenna on a metal box and such. To obtain optimum performance from the antenna, attach on a metal plate (recommended dimension: 500 mm × 500 mm or more). However, in the case of connecting FE1 to a metal plate, the isolation between FE1 and antenna connector will be lost. Tighten the connector with a specified torque (0.9 N·m). As a guide, finger-tighten it until the connector stops, and then rotate it 10 to 15 degrees with a wrench. Do not force the cable to bend less than acceptable radius of 3 cm.
• Using 7.5 m coaxial cable (model: CX-SAC0SAD0Q0750) (OKI) for extension decreases transmission distance.
• When installing the rooftop antenna outdoor, perform regular maintenance and inspections because of the risk of corrosion depending on the environment.

■ WIRING

• Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.
• Use a shielded twisted pair (STP) cable as a LAN cable.

■ AND ....

• The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
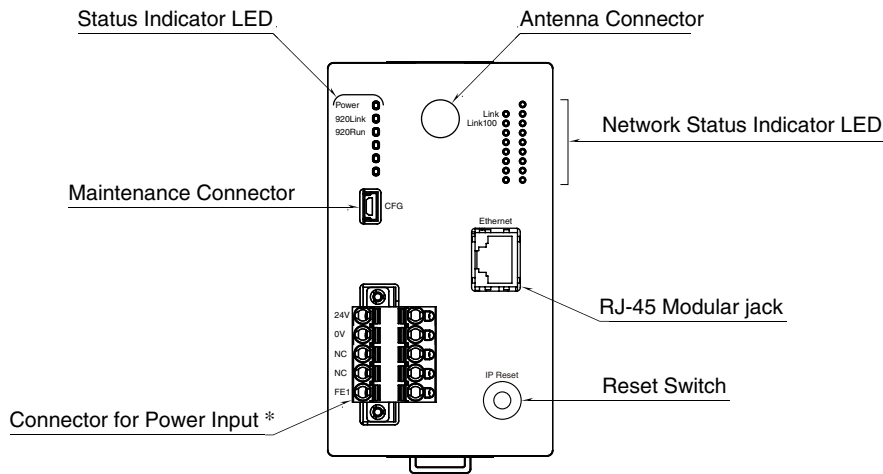
CAUTION REGARDING RADIO FREQUENCY

• For use in Taiwan only.
• When using a device incorporating this product, obtaining certification may be necessary due to NCC regulations.

■ NCC CAUTION

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

COMPONENT IDENTIFICATION

■ **FRONT VIEW**

Status Indicator LED

Antenna Connector

Network Status Indicator LED

Maintenance Connector

RJ-45 Modular jack

Reset Switch

Connector for Power Input *

＊ Power input defers depending on the power input code you select.

■ **STATUS INDICATOR LED**

ID	STATUS	COLOR	FUNCTION
Power	ON	Green	Power is on.
	Blinking		Reset switch is on.
	OFF		Power is off, or device error occurring.
920Link	ON	Green	Wireless: operating
	0.5 Hz blinking		Wireless: starting up
	OFF		Wireless: stopping
920Run	ON	Green	Wireless: normal communication with child device

■ **NETWORK STATUS INDICATOR LED**

ID	STATUS	COLOR	FUNCTION
Link	ON	Green	Linking via 10BASE or 100BASE
	Blinking		Sending / Receiving data
	OFF		No link
Link100	ON	Green	Linking via 100BASE
	OFF		Linking via 10BASE or no link

■ **RESET SW**

Press and hold the SW for two seconds or more, so that Power LED blinks and the existing settings are initialized to the factory settings. Release the SW after confirming the power LED is blinking, so that the initialization starts and the unit reboots. Use this procedure if you are not sure of IP address or other settings.

■ **TERMINAL ASSIGNMENTS**

• **Connectors for power input**

Unit side connector: MSTBV2,5/5-GF-5,08AU (Phoenix Contact)
Cable side connector: TFKC2,5/5-STF-5,08AU (Phoenix Contact)

Power input code: R (24 V DC)

ID	FUNCTION
24V	Power input 24 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

Power input code: S (12 V DC)

ID	FUNCTION
12V	Power input 12 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

WEB BROWSER SETTING

With web browser, settings shown below are available.
Refer to the operating manual of EM-9115-B for detailed operation.

■ TCP / IP SETTING

ITEM	SETTING RANGE	DEFAULT
IP address	1.0.0.0 – 223.255.255.255	192.168.0.1
Subnet mask	224.0.0.0 – 255.255.255.255	255.255.255.0
Default gateway	0.0.0.0 – 255.255.255.255	0.0.0.0

■ MODBUS / TCP SETTING

| ITEM	SETTING RANGE	DEFAULT
Port	1 – 65535	502
Modbus exception response	Not return 06 (BUSY), 0B (ERROR) / Return 06 (BUSY), 0B (ERROR)	Return 06 (BUSY), 0B (ERROR)
Communication timeout	1 – 60 (min.)	1 (min.)

■ WIRELESS SETTING

ITEM	SETTING RANGE	DEFAULT
PAN ID (group number)	0000 – FFFE (hexadecimal, 4 digits)	0000
Radio channel number	1 – 8ch	1ch
Network name	English one-byte characters within 16 characters (one-byte space, "-", "_", ".", "@" are usable.)	MH920
Encryption key	0000...0 – FFFF...F (hexadecimal, 32 digits)	0000...0
Prefix	2000:0000:0000:0000 – 3FFF:FFFF:FFFF:FFFF	2000:0000:0000:0000
Transmitter power output	0.16mW / 1mW / 20mW	20mW
Device type in a network, Number of devices in a network	Child (fixed), 1 to 30 devices / Child (fixed), 31 to 60 devices / Child (fixed), 61 to 100 devices / Child (fixed) + child (moving)	Child (fixed), 1 to 30 devices
Set network quality	Standard (recommended) / Frequency of route switching and delay (higher) / Frequency of route switching and delay (highest)	Standard (recommended)
Network join mode	V3-compatible mode / Fast join mode	V3-compatible mode
Packet filtering	None / Yes (polling type)	Yes (polling type)
Filter timeout on polling	1.0 – 60.0 (sec.)	4.0 (sec.)
Setting mode of short address	Range mode: 1 device (max. multi drop number) Range mode: 1 to 4 devices (max. multi drop number) Range mode: 1 to 8 devices (max. multi drop number) Range mode: 1 to 16 devices (max. multi drop number) Range mode: 1 to 31 devices (max. multi drop number) List mode	List mode
920Run timeout	0.0 – 3200.0 (sec.)	5.0 (sec.)
Retry times before route switching	Once / Twice / Three times	Three times
Short address list setting	Short address	—
MAC address list setting	MAC address	—
Connection refusal list setting	MAC address	—

Note: For version confirmation of communication module, refer to the operating manual of EM-9115-B for detailed operation.
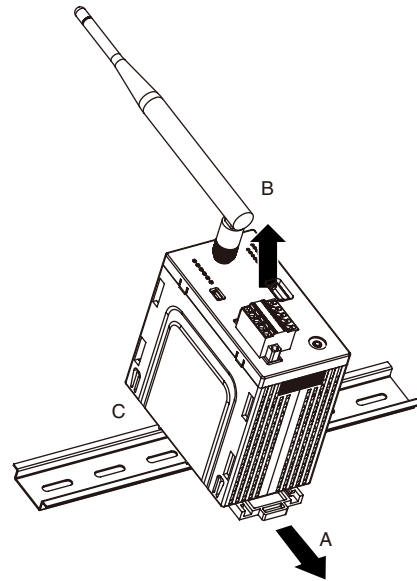
INSTALLATION

■ DIN RAIL MOUNTING (PARALLEL)

A) Hook the upper hook at the rear side of the base onto the DIN rail.

B) Push the lower part of the unit in the direction of the arrow until the base is firmly fixed to the DIN rail.
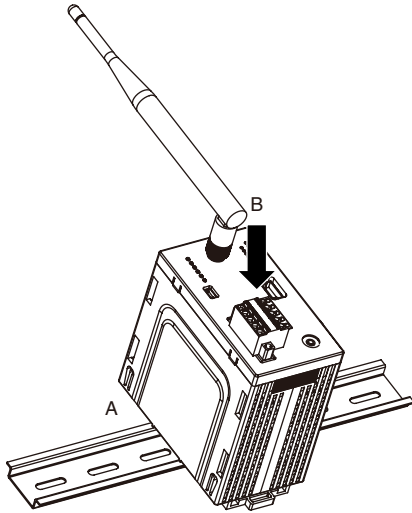
■ DEMOUNTING

A) Push down the slider using a minus screwdriver.

B) Pull out the lower part of the unit.
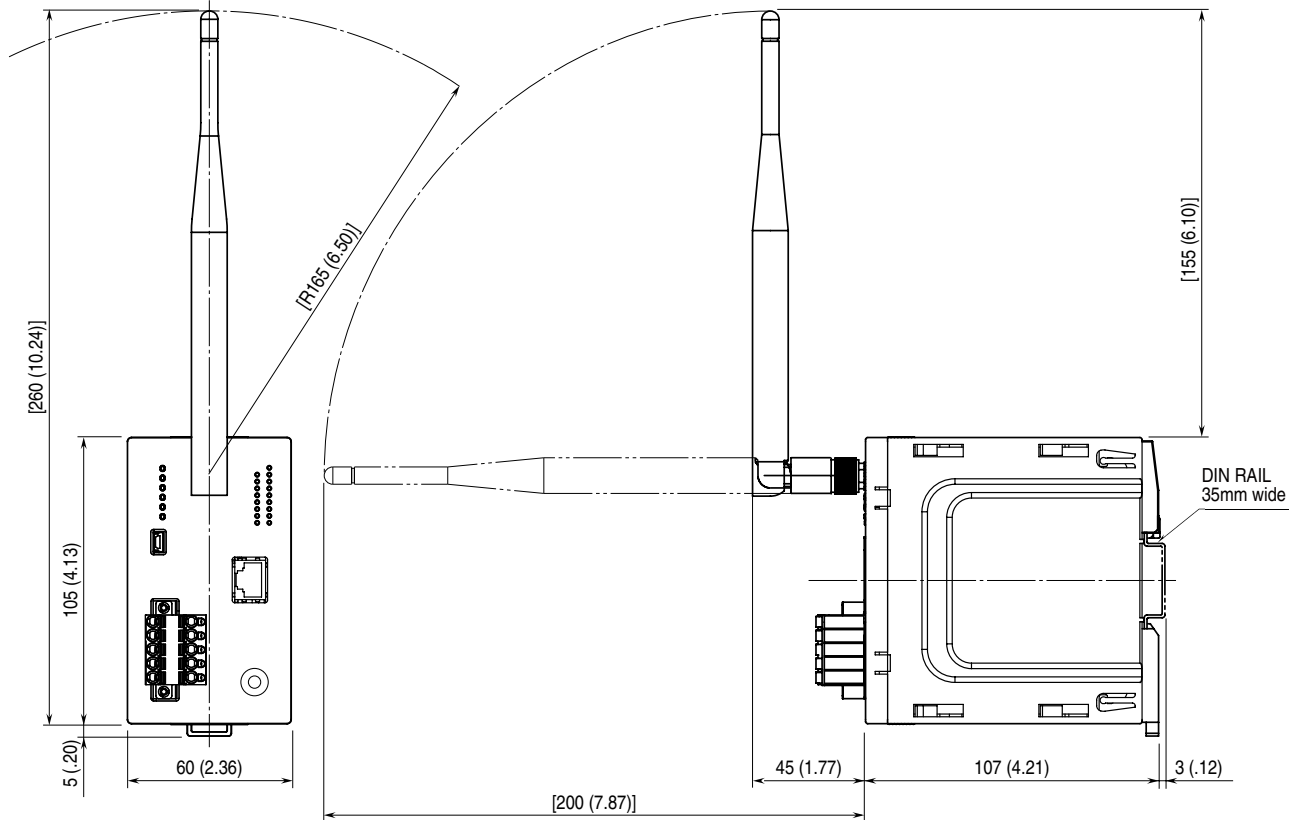
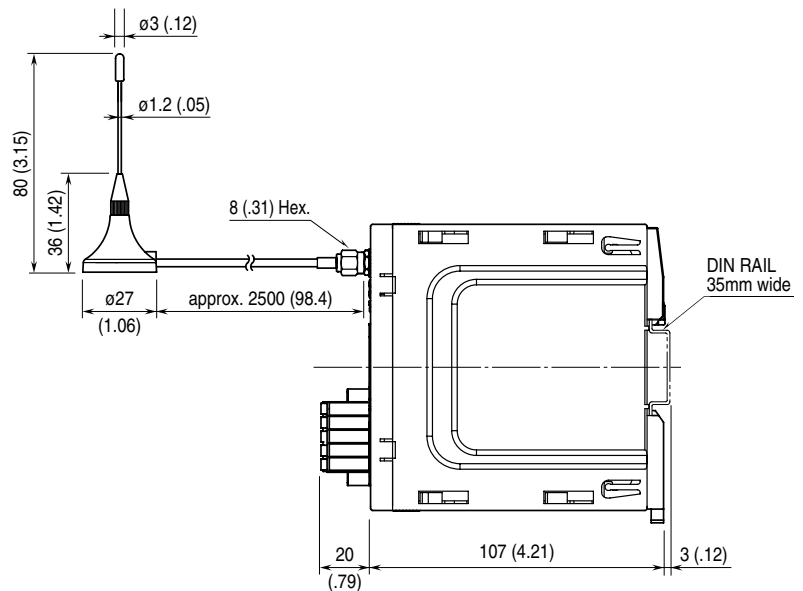C) Remove the upper part of the unit from the DIN rail.

TERMINAL CONNECTIONS

Connect the unit as in the diagram below.
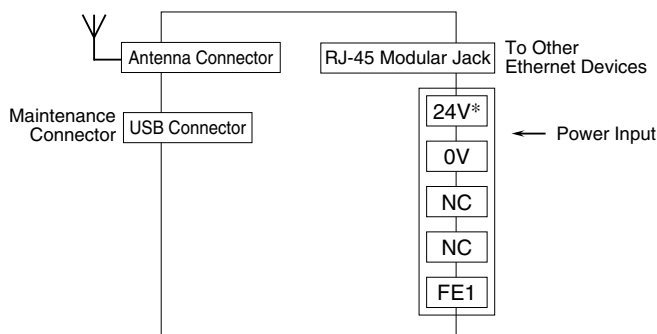
■ **EXTERNAL DIMENSIONS unit: mm (inch)**

• **With sleeve antenna**

• **With rooftop antenna**

■ **CONNECTION DIAGRAM**

* Power input defers depending on the power input code you select.

WIRING INSTRUCTIONS

■ **TENSION CLAMP (FRONT TWIN CONNECTION) FOR POWER INPUT**

Applicable wire size: 0.2 to 2.5 mm²
Stripped length: 10 mm
Recommended terminals:

AI0,25-10YE	0.25 mm²	(Phoenix Contact)
AI0,34-10TQ	0.34 mm²	(Phoenix Contact)
AI0,5-10WH	0.5 mm²	(Phoenix Contact)
AI0,75-10GY	0.75 mm²	(Phoenix Contact)
AI1-10RD	1.0 mm²	(Phoenix Contact)
AI1,5-10BK	1.5 mm²	(Phoenix Contact)
AI2,5-10BU	2.5 mm²	(Phoenix Contact)

CONFIRMING ETHERNET CONNECTION

■ **PREPARATION FOR NETWORK CONNECTION**

To configure the settings for the device WL40EW2TW via a network, a Windows PC, which can be connected to the network, is required. Confirm the settings of destinations such as the PC.
1) Connect the device and the PC with a LAN cable (STP cable).
2) Set PC's IP address "192.168.0.xxx" which is not the same as the device. (example: 192.168.0.10)
   Set subnet mask "255.255.255.0". (Factory default IP address of the device is "192.168.0.1".)

■ **SETTING FOR THE DEVICE**

1) Activate web browser, and enter the IP address of the device following "http://" in the address bar.
   If this is the first-time connection, enter the factory default IP address as below.
   http://192.168.0.1./
   Web browser (recommended): Microsoft Internet Explorer 11 or more
2) Enter user name and password.
   "admin" as user name and "admin" as password are designated for the first time connection.
3) For various settings, refer to the users manual (EM-9115-B) for detailed operation.

■ **CONNECTION TO NETWORK**

When wiring is correct, LED of LINK or LINK100 is ON or blinks.

■ **CHECK FOR WL40EW2TW CONNECTION**

Open Command Prompt in Windows, and enter "ping command" as follows:

C: ¥WINDOWS > ping ***.***.***.***
(***.***.***.***: Enter IP address in decimal.)

ping ***.***.***.*** with 32 bytes of data:
Reply from ***.***.***.*** : bytes=32 time < 10ms TTL = 64
Reply from ***.***.***.*** : bytes=32 time < 10ms TTL = 64
Reply from ***.***.***.*** : bytes=32 time < 10ms TTL = 64
Reply from ***.***.***.*** : bytes=32 time < 10ms TTL = 64

Ping statistics for ***.***.***.***
Packets : Sent = 4, Received = 4, Lost = 0 (0% loss)

Replies in case of normal connection are as shown above. If the connection cannot be established normally due to e.g. wrong IP address, other replies such as 'timeout' will be received.

MODBUS FUNCTION CODE

Modbus function codes are shown below.

■ **DATA AND CONTROL FUNCTIONS**

CODE	NAME	
01	Read Coil Status	Digital output from the slave (read/write)
02	Read Input Status	Status of digital inputs to the slave (read only)
03	Read Holding Registers	General purpose register within the slave (read/write)
04	Read Input Registers	Collected data from the field by the slave (read only)
05	Force Single Coil	Digital output from the slave (read/write)
06	Preset Single Register	General purpose register within the slave (read/write)
15	Force Multiple Coils	Digital output from the slave (read/write)
16	Preset Multiple Registers	General purpose register within the slave (read/write)

■ **EXCEPTION CODES**

CODE	NAME	
06	Slave Device Busy	Device's Modbus/TCP request queue is full.
11	Gateway Target Device Failed To Respond	Response from 920MHz band wireless device (child) is error, or response timeout occurred.

Note: When 920MHz band wireless device (child) returns an exception code other than the above, the exception code is directly transmitted to upper devices.

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.